



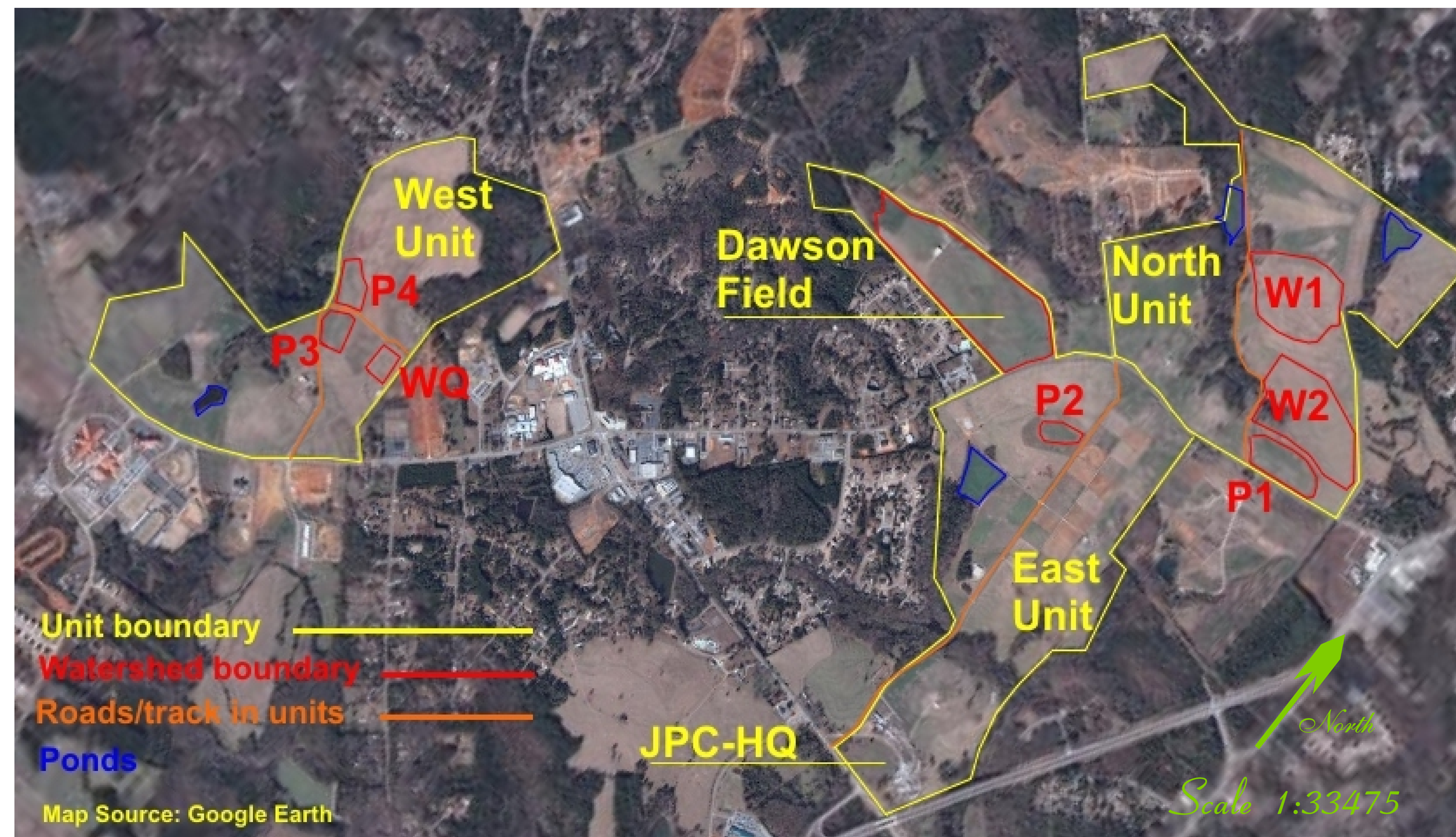
# INTEGRATED WATERSHED RESEARCH

Avenue Towards Sustainable Economic and Environmental Agricultural Production  
USDA-Agricultural Research Service, J. Phil Campbell Sr. Nat. Res. Conservation Center, Watkinsville-GA



## PURPOSE

- In order to efficiently utilize and protect our natural resources we must understand what they are made of and how the pieces function in harmony
- Integrated watershed research offers us an opportunity to do just that through collection, documentation, interpretation and dissemination of basic data, information, and knowledge of watershed processes and function
- These activities serve as a basis for design, implementation, monitoring, evaluating, and understanding watershed management practices and programs and their impact, and to predict watershed response to alternative land use and management practices
- Water flow creates a physical link between the land and streams. Water is erosive, a solvent for nutrients, and a key component of agriculture and natural habitats. To understand our natural environment, we must know how water gets from land to streams and what it does in the process



Unit boundary

Watershed boundary

Roads/track in units

Ponds

Map Source: Google Earth

## RESOURCES AND CAPABILITIES

- Located within a typical Southern Piedmont landscape
- Cropped watersheds: P1, P2, P3, P4
- Grazed watersheds: W1, W2, and #14 at Dawson Field
- Experimental watershed, an outside hydrologic laboratory: the North Unit with measurable springs, stream, ponds, and cropped and grazed catchments
- Twelve instrumented water quality plots - WQ
- Twenty six groundwater monitoring wells
- Several full and partial weather stations
- Soil physical, chemical, and microbiological laboratory facilities
- Laboratory capability for map analysis using geographic information system and global positioning system
- Interdisciplinary team
- Partners and Cooperators: UGA, EPA, NRCS, other ARS locations, other universities, environmental groups, local, state and federal agencies involved in natural resource issues, farmers and producer groups and commissions



W1 - Weir

W2 - Flume

P1 - Flume



W2 Spring - Flume

Pond Outflow - Flume

Pond Inflow Weir

Pond Level Sensor



Conven. Till Runoff - Flume

No-Till Runoff - Flume

Groundwater Level - W2 Wells

## PRODUCTS

- Rainfall-runoff relationships, and losses of sediment, nutrient, such as nitrogen and phosphorus, and fecal bacteria and pathogen by land use across multi-scale watersheds
- Hydrologic and chemical response of groundwater and springs to land use and variable climate
- Effectiveness of small wetlands and farm ponds to sequester nutrients and fecal bacteria
- Components of nitrogen in wetlands and shallow subsurface
- Knowledge of controlling factors of spatial and temporal distribution of soil water across landscapes
- Evaluation of tillage (conservation vs conventional) and fertilizer (inorganic vs poultry litter) practices on productivity and environmental response of watersheds
- Improved management practices
- Database for testing and evaluating environmental models
- Integrated grazing and cropping system analysis
- Analysis of agricultural-urban interface interactions



STEPHEN



DINKU



P1 Conventional vs Conservation Tillage



Dawson Field Paddocks - #14

OUTREACH



## CONTACTS

USDA-ARS-JPCSNRCC, 706-769-5631

Dinku Endale - Agricultural Engineer, X239, dendale@uga.edu

Stephen Norris - Ag. Research Technician, X221, snorris@uga.edu

## SCIENTISTS

Dinku Endale, Harry Schomberg, Dwight Fisher, Wayne Reeves, Alan Franzluebbers, Michael Jenkins, Clara Parker, Ron Sharpe, Dory Franklin

## PRIMARY SUPPORT PERSONNEL

Stephen Norris, Robin Woodroof, Tony Dillard, Jeff Scarbrough, Steve Knapp, Shaheen Humayoun, Ronald Phillips, Beth Barton